An Abbreviated Administrative and Organizational History of the Southern Forest Experiment Station

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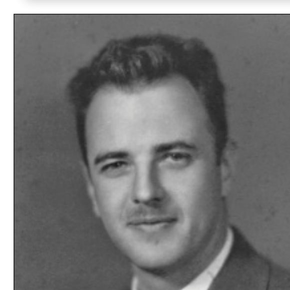
When established in 1921, the Southern Forest Experiment Station (SOFES) was headquartered in New Orleans, LA—a somewhat ironic choice, given the distance from New Orleans to the major southern forests and most of the Station's territory (Fickle 2001). According to Forbes (1925), New Orleans had originally been seen as a temporary Station headquarters, but further study into its relative advantages soon conferred its permanence. New Orleans was near some of the southern forests most devastated by lumbering and was a regional rail transportation hub, an important consideration at a period when travel was still difficult and time consuming. Just as importantly, U.S. Department of Agriculture Forest Service staff had begun some research in the nearby Louisiana locations of Bogalusa and Urania, providing a kernel upon which to expand the effort. It was for many of these same reasons that the Appalachian Forest Experiment Station (AFES) was headquartered in Asheville, NC.

As an agency, the Forest Service provided virtually no guidance regarding the organization and administration of its experiment stations at this time. Rather, each station developed as a function of both its location and the leadership of its director and limited staff. The SOFES offers prime examples of such influential leadership, having been shaped in its earliest years by men like Reginald D. Forbes (the first director) and his immediate successor, Elwood L. Demmon (see app., p. 161).

These regionally based forest research organizations derived their distinctive character from the ascendency of certain localized needs, attitudes, and ideas, as well as larger scale challenges. Indeed, one of these early SOFES staff members, Philip Wakeley, remarked that circumstances such as war and appropriations have overshadowed directorships and "more than one project worker has influenced Station events more than, and sometimes in spite of, his Director" (Wakeley and Barnett 2016).

The accomplishments during these early years of the Station's history by a small cadre of researchers were remarkable. Many of the details known about the first decades of SOFES administrative history come from Wakeley's "biased" history, written before his retirement. Wakeley also suggested six eras (to his retirement in 1964) for the SOFES to help understand its history (Wakeley and Barnett 2016). We have expanded upon his sixth era (to 1980) and added two more eras: a



Top: **Reginald D. Forbes** served as the first Director of the Southern Forest Experiment Station from 1921 to 1927.

Middle: **Elwood L. Demmon** replaced Reginald D. Forbes as Director of the Southern Forest Experiment Station in 1927 and served in that capacity until 1944. Demmon returned to the South as Director of the Southeastern Forest Experiment Station from 1951 until 1956.

Bottom: **Philip C. Wakeley** in 1935. Wakeley led reforestation research at the Stuart Nursey in Pollock, LA, using primarily Civilian Conservation Corps (CCC) labor.

seventh to cover the 28 years between Wakeley's retirement and the early 1990s and an eighth for the merger between the SOFES and the Southeastern Forest Experiment Station (SEFES) that produced the Southern Research Station (SRS).

1921–1927	Primitive Era
1928–1932	Era of Expansion and Recognition
1933–1938	Relief Era
1939–1945	Defense Era and World War II
1946–1959	Era of Territorial Research
1960–1980	Era of Renewed Functional Research
1981–1992	Era of Research Maturation
1992–1995	Era of the Merger

PRIMITIVE ERA: 1921–1927

In the Primitive Era, the potential for forestry to restore the South's aggressively harvested virgin forests started to be recognized. There was excitement due to the remarkable research advances that followed the work of a small cadre of scientists and professional foresters and the anticipation of even greater accomplishments. The Forest Service led the way during this period.

When the SOFES was first established, needed research into the southern pine forest types dictated the scientific direction and geographic footprint of the Station (Anon. 1921, Keller 1921). At this time, the SOFES territory included all of Alabama, Louisiana, Mississippi, and Florida, the coastal plains of South Carolina and Georgia, the southern pine-dominated lands of eastern Texas and southeastern Oklahoma, and the pineywoods of Arkansas south of the Arkansas River. However, the Station had no responsibility for conducting research in the hardwood types of its territory—that would develop in the next era.

Organization and management

Reginald Forbes was a 1913 forestry graduate of Yale University and served the SOFES as its first director (app.) until 1927, when he left to help form the Allegheny Forest Experiment Station. During the Primitive Era, Forbes managed the implementation of the research direction of the SOFES and hired the staff required to establish its programs. He did this from a sparsely furnished office in the Custom House on Canal Street in New Orleans. Room 323 contained Director Forbes's desk, Vera M. Spuhler (the only clerk with her own desk), a few chairs and filing cabinets, and a handful of books in a single glass-fronted bookcase.

Resources to support the newly opened SOFES's operations were very limited. Up to July 1, 1924 (then the beginning of the Federal fiscal year), SOFES annual appropriations had been $15,000 per year to cover staff salary, fleet, materials, and supply needs (Forbes 1925). Even when the Station's budget more than doubled to just under $39,000 in FY1925, resources would continue to constrain operations. For instance, two Model-T Fords were obtained in late 1924 for transportation. However, there was no per diem for travel; records of actual expenses had to be maintained on a sub-voucher to support any expenses over a dollar and such claims had to be sworn to before a duly constituted official.

Staff members furnished their own reference materials, and the researchers were also required to maintain a daily diary where activities and expenses were documented.[1] Wakeley describes having to swear to his account before a notary at 50 cents per oath or he could swear without charge before local postmasters (Wakeley and Barnett 2016). To conserve expenses, Wakeley—then in charge of reforestation research at Bogalusa, LA—was officially transferred to that location to avoid having to pay his per diem. As further evidence of the tight budget, when Wakeley requisitioned some paper clips for his office, Chief Clerk Spuhler sent him 12 in an envelope with a note encouraging him to use them carefully, as they were all she could allocate to the Bogalusa work center (Wakeley and Barnett 2016).

Staffing was also quite limited during the Station's earliest years. For much of this period, there were about as many lines of work as permanent members of the staff. For example, when Wakeley was hired in 1924, there were only six professional foresters (including Forbes, the Station Director), Chief Clerk Spuhler, Stenographer Alicia P. Nolan, and a few temporary field assistants on the Station's staff (Forbes 1925, Wakeley and Barnett 2016). Because much of the work required small crews, work trading was a feature of the Station's program.

“Despite the limited resources, staffing, and some shortcomings in their research techniques, a sound foundation was established during the Primitive Era.

Despite the limited resources, staffing, and some shortcomings in their research techniques, a sound foundation was established during the Primitive Era. Partnerships with other agency scientists (such as Drs. Austin Cary and Eloise Gerry), outside agencies (such as the U.S. Department of Agriculture Bureau of Soils and Bureau of Chemistry), various other Federal and State agencies, and key university collaborators (such as Professor H.H. Chapman of Yale University) expanded the reach and scope of the fledgling organization (Forbes 1925). Significant research activities began in a wide array of disciplines.

Field locations

In addition to the headquarters in New Orleans, the SOFES during the Primitive Era conducted most of its field-based research at a handful of locations across its territory, including cooperative ventures with the timber industry at Bogalusa and Urania, LA; McNeill, MS; and Starke, FL (Forbes 1925). Although these company-owned locations were important during the first decades of the Station, they would be closed later for various reasons, including establishment of new designated experimental forests. Other field stations on public lands would be established near the end of the Primitive Era, with a location named the Choctawatchee Branch Station near Pensacola, FL, selected in 1926 (SOFES 1927).

Research priorities and accomplishments

In his history of the SOFES, Wakeley described the Station as having five general areas of research in 1924. The first of these—mensuration, or the measurement of trees and stands—arose from the need to better understand the growth potential of southern pine forests. The other major research areas of this era included work in thinnings and reproduction cuttings, naval stores studies, fire, and reforestation efforts.

[1] These pocket-sized diaries were still available to scientists when the lead author arrived at the Station in 1961, but the requirement for their use had been discontinued years earlier.

Research priorities were set in part by station directors, Washington Office directives, the interests of individual investigators, and recommendations from an advisory council consisting of individuals from outside of the Federal Government, especially persons associated with the timber industry and State Government agencies. When exactly this council was established and chartered is unclear, but the SOFES annual report through 1925 (SOFES 1926) reported on its expansion with the addition of four new men appointed by the USDA Secretary (that advisory council was chaired by Urania Lumber Company's Henry Hardtner). Such outside advisory bodies would continue to be used by the Forest Service to help steer agency research for many years to come.

Mensuration—Station Director Forbes had a particular interest in measuring trees, and his efforts supported this interest. This included staff recruited to the SOFES, such as 1926 University of Minnesota graduate Roy A. Chapman. Chapman's 1926 arrival and subsequent work in the years that followed helped to bring about the adoption of statistical techniques by the Station. Chapman spent much of those early years with the experts who were developing statistical tools and techniques. He brought these advancements to the SOFES, making the Station a leader in these applications and thus adding greatly to the credibility of its research program (Wakeley 1980, Barnett 2016).

For example, the Station's first major accomplishment was in mensuration. With technical guidance from Donald Bruce of the Washington Office, a series of sample plots were established in even-aged, second-growth pine (*Pinus* spp.) stands throughout the South. The result of this major effort was the development of volume, stand, and yield tables for unmanaged second-growth stands of loblolly (*P. taeda*), longleaf (*P. palustris*), shortleaf (*P. echinata*), and slash (*P. elliottii*) pines.

The results from this study were published in a small handbook (Miscellaneous Publication 50, also known as "MP-50") easily carried in a pocket to facilitate its use in the field (USDA Forest Service 1929). MP-50 gave foresters and landowners the capability to understand the growth potential of the major southern pines and offered some of the first steps toward forest management in the pine forest types of the South. This little publication proved to be of such practical value and demand that the SOFES updated and reprinted it in 1976, and the material it contains continues to be used by managers and researchers to this very day.

Thinning and reproduction cutting—Studies of harvest and reproduction cutting of even-aged, second-growth loblolly and shortleaf pines by using natural regeneration were also installed at the Urania Branch Station, first under the direction of W.R. (Billy) Hine (Hine would leave in 1925 to become the State Forester of Louisiana). The first silviculture study of the SOFES was a thinning project at Urania with origins dating back to 1915, when Samuel Trask Dana (then with the Washington Office) worked with Henry Hardtner, head of the Urania Lumber Company, to install a series of small, unreplicated plots in even-aged loblolly and shortleaf pine-dominated old field stands (Bragg 2021b, Wakeley and Barnett 2016, Wyman 1922).

Related to the reforestation effort was a study on the negative influences of cattle and hogs on forests—this was a significant problem. Across the South, a primary use of cutover forests was for livestock grazing and there were no restrictions—

open range grazing was almost universally practiced. Hogs were considered a major threat to getting pine forests reestablished, especially for longleaf pine, which were particularly vulnerable to hog depredations. Apparently, the carrot-like roots of longleaf seedlings proved to be choice hog food, and Hardtner demonstrated that fencing areas was needed to achieve longleaf pine regeneration (Hardtner 1935).

Naval stores—By 1922, Lenthall Wyman had been dispatched to Florida to work on empirical research on the production of "gum" naval stores. Since at least 1700, naval stores (which included tar, pitch, resins, and other chemical compounds) had been a major product of southern pine forests—especially longleaf and slash pines (Barnett 2019). Originally extracted from deadwood or downed trees, by the early 1880s, standing live pines were "tapped" by cutting "boxes" in the base of a tree to collect the resin (gum) which flowed from these wounds. The turpentining practice resulted in the destruction of many southern pine forests, starting in North and South Carolina and then moving westward into Georgia, Alabama, and Florida, eventually reaching Louisiana and Texas by the early 1900s.

When the SOFES opened, improvements in techniques had largely eliminated the box collection system and moved to the use of gutters to collect the gum. Still, the practice was very damaging and frequently lethal to the trees. During his years in Florida, Wyman worked with naval stores producers to develop substantial savings in labor, reduce tree mortality, and made other significant impacts towards improving naval store operations. For example, one of his accomplishments was reducing the depth of the cuts into the tree cambium which reduced mortality and increased the tree's later usefulness for lumber. Wakeley and Barnett (2016) commented that by "…direct contact with key men in the naval stores industry, Wyman got his results into practice, and did so I feel sure, more quickly than he could have by whole batteries of publications. In a decade or less, he revolutionized the industry." Much of his research was summarized in a technical bulletin published by the Washington Office (Wyman 1932).

Fire—Fire was officially one of the most important initial research efforts of SOFES, and all early Station staff worked in this field. Hardtner had begun working towards fire suppression on Urania Lumber Company lands in 1913. Fire-related investigations at Urania began over the next few years in collaboration with specialists from the Forest Service's Washington Office. Before 1920, a series of treatments relating fire suppression and prescribed fire with southern pines (especially longleaf) would be installed and collectively became known as the Roberts plots (Barnett 2016, Chapman and others 2023, Wheeler 1963).

Wakeley commented, however, that most of the other fire research consisted of compiling long lists of fire-killed seedlings, brown foliage on saplings, and fire scars on living trees (Wakeley and Barnett 2016). After all, the general Forest Service policy adopted after the catastrophic fires of 1910 was "all fire is bad." Indeed, the SOFES annual reports during most of the 1920s decried the widespread losses to fire in most southern forests, and SOFES (1925) listed fire protection as the most important field of SOFES research to that date.

However, this perspective was not universally accepted. Yale University Professor H.H. Chapman, who had brought the Yale School of Forestry summer camp

Top: Extracting naval stores in Florida, 1936. (USDA Farm Security Administration photo by Dorothea Lange)

Bottom: Southern Forest Experiment Station scientists and colleagues at the Roberts plots, near Urania, LA, April 1940. From left: H.H. Chapman of Yale University; USDA Forest Service scientists C. Allen Bickford, H.H. Muntz, G.W. Trayer, Clarence L. Forsling, Roy A. Chapman, T.R. Traux, John Curry, and J.M. Hughes; and Lloyd Blackwell, who became the head of Louisiana Tech University's Department of Forestry.

to Urania in 1917, challenged the Forest Service's anti-fire doctrine, thereby compelling the SOFES to approach fire with greater objectivity. Chapman became a proponent of controlled use of frequent prescribed fire as a means of controlling wildfires and, more importantly, stimulating forest regeneration of southern pines (Chapman 1932). During this period, the Forest Service largely opposed the application of prescribed fire as a management tool, even in forest types such as longleaf pine that showed signs of dependence on frequent fire for its long-term success. Indeed, during its early decades of existence, SOFES leadership and researchers aggressively opposed research by Chapman and others that suggested the utility of fire in longleaf pine (Schiff 1962).

Eventually, Wakeley and others in the SOFES began a large study to evaluate Chapman's contentions of the value of frequent (but not annual) fire in longleaf pine. With one exception, they found Chapman's positions were correct. By mid-20th century, most southern foresters accepted Chapman's conclusions and became advocates of controlled or prescribed burning (Wakeley and Barnett 2016).

“At the time, the practice of growing seedlings and planting them was in its infancy … in 1920, Bateman, noting that longleaf pines were producing a large cone crop, convinced Sullivan to allow him to fence 10,000 acres of an area scheduled for harvest to protect the area from hogs. The effort was successful and became a beautiful stand of 10,000 acres of longleaf pine—a great example of a modified shelterwood regeneration system (Wakeley 1976)

Reforestation—During the Primitive Era, artificial reforestation, or forestation (as it was designated in the agency's jargon) began as a minor effort. Hardtner, who was also a proponent of reforestation, convinced W.H. Sullivan of the Great Southern Lumber Company of its potential and Sullivan began an aggressive program to develop the technology (Barnett and Carter 2017). At the time, the practice of growing seedlings and planting them was in its infancy. When Wakeley arrived at the SOFES in 1924, he was assigned to this study at Bogalusa to collaborate with the Great Southern Lumber Company.

Prior to Wakeley's arrival, Sullivan appointed J.T. Johnson as the Great Southern Lumber Company forester and F.O. “Red” Bateman as his chief ranger. Neither had any forestry training, but remarkably, they made real progress in the development of reforestation technology. As an example, in 1920, Bateman, noting that longleaf pines were producing a large cone crop, convinced Sullivan to allow him to fence 10,000 acres of an area scheduled for harvest to protect the area from hogs. The effort was successful and became a beautiful stand of 10,000 acres of longleaf pine—a great example of a modified shelterwood regeneration system (Wakeley 1976). When Wakeley was assigned to Bogalusa, Bateman had nursery and planting techniques for loblolly and slash pines pretty well under control. Although further developed by Wakeley, Bateman had worked out the essentials of the practices still employed: slit planting of bareroot seedlings grown at a moderate seedbed density, the planting tool or dibble, and the 6- by 8-foot planting spacing.

Problems remained with regenerating longleaf pine, however. Although it was the species most desired for reforestation, the problems related to seed production, seed quality, and survival during the grass stage limited successful reforestation efforts. Reforestation efforts with southern pines would continue to be a major research emphasis for the SOFES throughout its history.

ERA OF EXPANSION AND RECOGNITION: 1928–1932

Modest budget increases during the Primitive Era (the FY1929 SOFES budget was up to $41,200) allowed for additional if modest hiring of staff in the researcher, office, and other field support staff categories (SOFES 1929) (table 1). This modest growth would soon be swelled by legislative, economic, and social changes, such as the 1928 passage of the McSweeney-McNary Act. During the Era of Expansion and Recognition, the SOFES recruited an even broader group of researchers with specialized training in botany, ecology, economics, erosion control, hardwood management, physiology, plant pathology, statistics, and utilization. With this larger and better-trained staff, the Station pursued a number of new or expanded research questions. Although most of the work was still concentrated in the original lines of research, additional studies associated with the role of forests on flooding,[2] grazing impacts on pine regeneration, insects and diseases, hardwood forest conditions, forest economics, and the initial efforts to conduct large-scale forest surveys began during this era (e.g., SOFES 1929).

Table 1—Staff composition of the Southern Forest Experiment Station, 1928 and 1932

Agency	Class of employee	Number employed	
		1928	*1932*
Forest Service	Professional, director	1	1
	Professional, principal	–	1
	Professional, full grade	–	3
	Professional, associate	2	4
	Professional, assistant	2	6
	Professional, junior	4	16
	Professional, agent	1	1
	Professional, temporary field assistant	10	12
	Nonprofessional, field	1	1
	Nonprofessional, clerical	6	14
Bureau of Plant Industry	Professional, permanent	1	3
	Professional, temporary field assistant	–	2
Total		**28**	**64**

Source: Wakeley and Barnett (2016).

The Station, too, had gained recognition for its significant contributions to the application of forestry practices in the South. Visitors from around the world came to meet with SOFES scientists and tour their research projects (Wakeley 1980).

Wakeley described the attitude and capability of the SOFES scientists in the beginning of the era this way:

> *High aspirations, a yeasty intellectual ferment, improved perspective and a better grasp of experimental procedures marked the Second Era… Those of us already at the Station were learning much, both from our wealth of experimental material and from our past mistakes. New young recruits came from a great number of schools and varied greatly in points of view…* (Wakeley and Barnett 2016)

[2] This followed the widespread floods of the Lower Mississippi River Valley during 1927; this work later became part of the "forest influences" line of research.

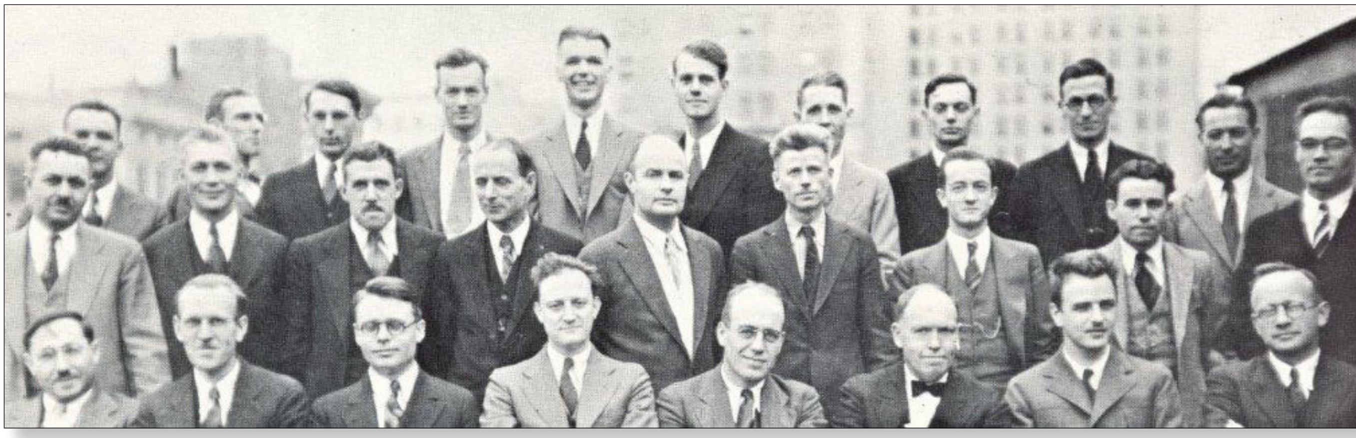
The group that met with Dr. Tor Jonson from Sweden at Bogalusa, LA, on September 15, 1925. From left, kneeling: R.D. Forbes, Director of the Southern Forest Experiment Station; Roy Hogue, State Forester of Mississippi; W.R. Hine, State Forester of Louisiana. Standing: J.K. Johnson, Great Southern Lumber Company; Norman Core, Louisiana Division of Forestry; Tor Jonson; Harry L. Baker, USDA Forest Service; Mr. Johansson (Jonson's interpreter); F.O. (Red) Bateman, Great Southern; and E.L. Demmon.

Their arrival was timely, as the Station grew from a staff of 23 in calendar year 1927, to 28 in 1928, to more than twice that number by 1932 (table 1).

Much of this growth was used to support the large-scale forest survey project that started during this era. The new staff were not all young recruits. During this expansion, the number of more senior (associate foresters or higher) researchers grew substantially, from two (not including the station director) in 1928 to eight in 1932. Over this same period, a dozen entry level or "junior foresters" were added and the clerical positions more than doubled to 14. Another area with large growth during this period was staff with plant pathology training, hired through the USDA's Bureau of Plant Industry (at this time, the Forest Service was not allowed to hire scientists with this specialty). Both the Forest Service and Bureau of Plant Industry also increased their temporary staff. These temporary field assistants were not given permanent status, but they too contributed greatly to the contributions of the Station (Wakeley 1980).

The establishment of the Rocky Mountain (in 1926) and Central States and Alleghany Forest (both in 1927) Experiment Stations refined the northern geographic boundaries for the SOFES and SEFES at the beginning of this era. By the end of 1930, the SOFES had grown from its initial (1921) location in Louisiana (New Orleans, with projects at Bogalusa and Urania) to a staff presence across much of its designated territory, including people and projects located at branch field stations in Mississippi (McNeill), Florida (Starke and Valparaiso), and Arkansas (Hot Springs) (SOFES 1930). Most of these "centers of work" were not the more permanent experimental forests, which would be established a few years later, but rather cooperative research locations on privately owned lands or in conjunction with certain national forests. This expansion also started to bring hardwood research projects into the Station's science portfolio.

Not all Station research efforts proved to be fruitful avenues of study—at least not as intended. For example, Wakeley (1980) reported that one of the biggest and most serious obstacles faced during the early years of the SOFES was an insistence on looking for support for the agency's policy against fire. Wakeley came to see the significant investment of limited Station resources on



Southern Forest Experiment Station professional staff (scientists and administrators) in 1932. Left to right, front row: L.J. Pessin, E.W. Gremmer, V.L. Harper, E.L. Demmon, G.H. Lentz, Lenthall Wyman, P.C. Wakeley, W.G. Wahlenberg. Second row: W.E. Bond, C.F. Olsen, R.B. Craig, P.V. Siggers, J.A. Putman, V.B. Davis, A.R. Spillers, H.G. Meginnis, R.K. Winters. Back row: Henry Bull, Allen Bickford, F.K. Beyer, Ellery Foster, J.A. Lubbe, P.R. Wheeler, J.W. Cruikshank, E.B. Faulks, R.R. Reynolds, M.M. Lehrbas.

searching for the detrimental consequences of fire rather than its potential as a management tool and fundamental process driving many southern ecosystems as a wasted opportunity.

Driving change at the Washington Office and station levels

As the agency's Research and Development program matured and grew, refinements came from both the national and station levels. One of the most substantial changes dictated by the Washington Office involved grouping the staff into separate subject areas called divisions. Originally, all work of the Station in protection, management, mensuration, naval stores, and reforestation were in one division, that of Silvical Research—later renamed Forest Management Research. Soon, separate Divisions of Economics and Forest Survey were established. Each division was headed by a division chief. At irregular intervals, other divisions were added and variously renamed and combined. For example, a Division of Station Management was created to help with the Station's administration. These separate divisions were the essential format of the Station until a major national reorganization of the Forest Service Research and Development program occurred in 1963.

After Demmon became SOFES Director in 1927, he implemented a series of major organizational and administrative changes in the Station. For instance, during the first 7 years of the Station, Head Clerk Vera Spuhler handled all the Station's accounts and related matters of payroll, property, and supplies. In 1928, Demmon created an executive assistant position to head all the clerical responsibilities. Jack Lubble, who came to the Station after 5 years as District Ranger on the Nebraska National Forest, was assigned as executive assistant. Lubble was also given an additional duty as the personnel officer for the growing station. Lubble studied the regulations affecting promotions and personnel actions and corrected instances where employees were stuck for years at one step in grade. Lubble intervened and corrected several injustices in staff pay involving both male and female employees (Wakeley and Barnett 2016).

In 1932, Demmon created a system of numbering station publications and gave them the distinction of being called Occasional Papers. With the development of the regional experiment stations, station directors had to establish numerous research protocols, including how to transfer research findings to their user groups. There was no uniform approach to accomplish this and the SOFES developed its own publication series. Over time, Occasional Papers became increasingly professionally written, edited, designed, and printed (Barnett 2023a). This publication series helped gain public recognition and support for the Station and continued until the Forest Service Research and Development program was reorganized in 1963.

Demmon also supported new efforts to expand upon the research infrastructure and invested in the human capital needed to further the science. Under his administration, the SOFES began the formal establishment of experimental forests that would come to dominate field research efforts. During the earliest years of the SOFES, the Station relied on cooperation with private landowners (such as the Urania Branch Station in central Louisiana) and informal arrangements with national forests to conduct field research. While workable on a limited scale, this approach proved challenging when a timber company went bankrupt, changed their management approach, or lost interest in collaborating. Early calls to develop formal experimental forests operated by the Forest Service went largely unheeded and lacked specific authorities until the McSweeney-McNary Forest Research Act of 1928 was passed into law. Regulations to codify the Act were completed in 1930 (Clapp 1931). In June 1931, the SOFES opened their first experimental forest—the Olustee—in the slash pine-dominated forests of northern Florida, largely to support naval stores research (SOFES 1933). Experimental forests became critical for numerous types of field research, especially long-term research.

Demmon also sent some of his staff to temporary or special assignments to improve their skills and bring what they learned back to the Station. On one of the most prominent of these details, Roy A. Chapman went to the Washington Office on an extended (between 1931 and 1934) tour with the forest measurements group. There, Chapman added to his quantitative skills and he (and others such as J.G. Osborne and C.A. Bickford, who would later go to this same detail) would bring back many of the new concepts in statistics and experimental design that helped modernize SOFES research. Wakeley (1980) specifically credited Chapman's detail with "revolutionizing" their experimental design, improving sampling techniques, and introducing the statistical concepts of analysis of variance and interactions, thereby improving the quality of the work done in the SOFES.

Southern Forest Survey

These quantitative skills would come in handy as the Station ramped up its field data collection. The passage of the McSweeney-McNary Act of 1928 authorized a "forest survey" to conduct a nationwide inventory of the Nation's forests to support multiple interests, including the development of new timber markets. Responsibility for the survey of southern forests was assigned to the SOFES. Conducting an inventory of forest resources on over 200 million acres stretching from the South Carolina coast to the prairies of eastern Texas and Oklahoma was a huge challenge, especially since such an effort had never been previously attempted.

During the mid-1920s, the SOFES had started conducting what were called extensive surveys to make larger-scale assessments of forest conditions.

While Wakeley dismissed this initial effort for its inefficiency and lack of useful information (Wakeley and Barnett 2016), it did indicate to the Station that such surveys would need to be better designed and implemented if they were to provide the information and management tools desired. This motivation would soon be upon the SOFES, as Congress had passed a special $25,000 appropriation for the Station to begin a forest survey of southern hardwood forests as a part of the nationwide survey effort, with the funds to be spent in FY1931 (SOFES 1930). The appropriation for the Southern Forest Survey effort would increase to $40,000 in FY1932 (SOFES 1932), which was more funds for the survey in one fiscal year than were appropriated for the entire SOFES in FY1926 (SOFES 1927).

"Cap" Eldredge was selected to lead the Southern Forest Survey of more than 200 million acres of southern forests beginning in 1932. The field surveys were completed in 4 years, but the analyses and publication of the results went on until 1946.

Station Director Demmon assembled a well-qualified staff to develop the methodologies needed to conduct the survey and for recording and analyzing the data. Planning and implementation of this survey began in 1931, with a focus on the bottomland hardwood forests of the Mississippi River alluvial plain (SOFES 1932). The first test cruises of the survey were done in a couple parishes in northeastern Louisiana using 10 survey lines, spaced 3 miles apart, across a little more than a half million acres between late March and mid-June of 1931 (SOFES 1932). This preliminary work suggested satisfactory results could be gotten from wider spaced transects. A system was formulated where compass lines were run 10 miles apart across each State from Tennessee southward to the tip of Florida. At every 660 feet on these lines, plots were established across each State, and a great deal of information was collected on each plot (Eldredge 1935).

These lines were laid out and plots were installed by 5 crews of 4 workers; 7 such groups of 20 workers were to be placed under a single supervisor. Southwide, this meant that there would need to be up to 140 workers in the woods, plus additional staff to process and analyze the field data. Not surprisingly, then, the success of this forest survey effort was greatly influenced by the quality of workers available. In the midst of the Great Depression, many of the best timber workers in the South were available for the job. Even still, the best crews in the field could not coordinate such an effort. To do this, Demmon needed an exceptional individual to lead and manage this enormous field operation. He soon realized that the best qualified person with the needed background and experience was Inman F. "Cap" Eldredge (Barnett 2016).

Eldredge was not just a desk worker—he was in the field about a third of the time following crews and trying to keep their morale up. Morale was critical because the job was tough. For instance, every river in the South was crossed many times. Eldredge commented, "Georgia, for instance, was 300 miles from top to bottom. Well, it took thirty lines there, so we crossed every damn river thirty times… In the total survey, we did something like 40,000 miles on foot" (Maunder 1977).

Forest economics

Perhaps the program that would benefit most from improvements to the knowledge of southern forests would be the economics work of the SOFES (indeed, the forest survey effort would be housed in the broader forest economics program of the Station in FY1931). As eager as the South was for more forest industries, it wanted only those industries that would use the timber resource to become a permanent part of the economic structure, having learned the

> *"… the Civilian Conservation Corps (CCC) and the Works Progress Administration (WPA) [relief programs] allowed the SOFES to hire additional staff … expand and improve upon [its] research and administrative facilities, install and measure new studies, and disseminate its research to a broader audience (Wakeley 1980).*

hard way about the negative impacts of the fleeting industry that harvested and milled the virgin timber. Eldredge (1939) commented, "…the forests of the South will provide a sound basis for a secure future—an ever-continuing succession of timber crops that will be a permanent resource for a permanent industry." This realization would bring about enduring communities, more prosperous railroads and other utilities, stable and broad tax bases, and a better standard of living for southerners (Demmon 1937).

Although elements of this topic existed from the very earliest days of the Station, the SOFES began specific forest economics-based research during FY1930, funded by about one-quarter of the $82,500 appropriated for that year (SOFES 1929). The program's initial focus was on studying the financial aspects of timber growing in southern pines, especially on the lands of small farmers and the forest products industry. Gradually, issues such as forest taxation, stumpage values, case studies of the practices of large lumber companies, the new public domain (arising from increased rates of tax delinquency due to the Great Depression), and county-level assessments of forest conditions and values were also studied (SOFES 1930, 1932).

RELIEF ERA: 1933–1938

The SOFES continued to evolve into the 1930s, as local and regional needs helped to dictate research priorities. Over the first decade, the Station's Southern Forest Research Advisory Council had expanded and continue to advise the Station of research directions of interest (SOFES 1935). This council included people from key industries, including L.J. Arnold of the Crossett Lumber Company (Arkansas), L.O. Crosby of the Goodyear Yellow Pine Lumber Company (Mississippi), Colonel D.T. Cushing of Great Southern Lumber Company (Louisiana), and Urania's Henry Hardtner; key academics including Yale Professor Chapman and chemist Charles H. Herty of Georgia; and State agency representatives including Alabama State Forester Colonel P.S. Bunker and E.O. Siecke of the Texas Forest Service. With such a substantial industry presence, it is not surprising that the Station's research emphasized their needs.

Industry needs were not the only consideration. The SOFES was also strongly shaped by the impacts of the Great Depression, which started in 1929 and continued throughout most of the 1930s. All facets of American society were affected, including those related to the SOFES (Wakeley describes some of the Great Depression's serious effects on employees in early 1933 in Wakeley and Barnett 2016). Several years of limited responses by President Herbert Hoover, which concentrated more on streamlining the Federal Government, did little to recover the economy. Soon, newly elected President Franklin Delano Roosevelt's administration began a multitude of New Deal relief programs to stimulate the economy.

While a number of these programs greatly influenced the SOFES, two were particularly important: the Civilian Conservation Corps (CCC) and the Works Progress Administration (WPA). These relief programs allowed the SOFES to hire additional staff (some temporary, some permanent), expand and improve upon their research and administrative facilities, install and measure new studies, and disseminate its research to a broader audience (Wakeley 1980). Wakeley (1980) cited the contributions of a number of these temporary staff in contributing

The Forest Service's Stuart Nursery was built and operated by Civilian Conservation Corps (CCC) crews with Kisatchie National Forest supervision and supported by Southern Forest Experiment Station research. It produced 27 million seedlings annually to support the planting needs of Forest Service-sponsored CCC camps.

"original observations and important suggestions" while doing "vast amounts of high-quality routine work" vital to the Station's success. This included critical work to support the increasingly sophisticated analysis that Station scientists were working on, including statistics and large-scale forest surveys. To this end, the SOFES employed a number of support staff (some temporary, some permanent) listed as statistical clerks and operators of computing or tabulating machines to help process the large volumes of data collected for these tables (as well as other early forest survey efforts).

Increased Federal spending and relief programs to aid the economy provided other benefits as well. By 1934, the Station's research infrastructure had added a number of major experimental forests (many of which are still in operation) and an herbarium was developed. The headquarters library that had only a handful of texts in 1921 had expanded to 2,000 bound books, 700 volumes of periodicals, 15,000 bulletins, and 5,000 miscellaneous reports by 1934, of which a large portion had been added that year (SOFES 1935).

With its tremendous potential for economic development, Eldredge (1942) summed up the status as "…forestry is as surely a part of the South's future as is agriculture, mining, and manufacture and in no less degree. Without it the South cannot achieve its manifest destiny—and the South is on the march."

Experimental forest expansion

Many of the SOFES's experimental forests (table 2) were created in the 1930s and brought into the system through Federal funding for forest rehabilitation and rural economic relief, during and after the years of the Great Depression. After the June 1931 installation of the Olustee Experimental Forest in northern

Florida as the SOFES's first formally designated experimental forest, Station leadership estimated it would take 16 additional such forests (of 3,000 to 10,000 acres in extent) distributed strategically across the South to address the research questions at hand (SOFES 1933).

Table 2—Experimental forests of the Southern Forest Experiment Station, established and in operation by 1939

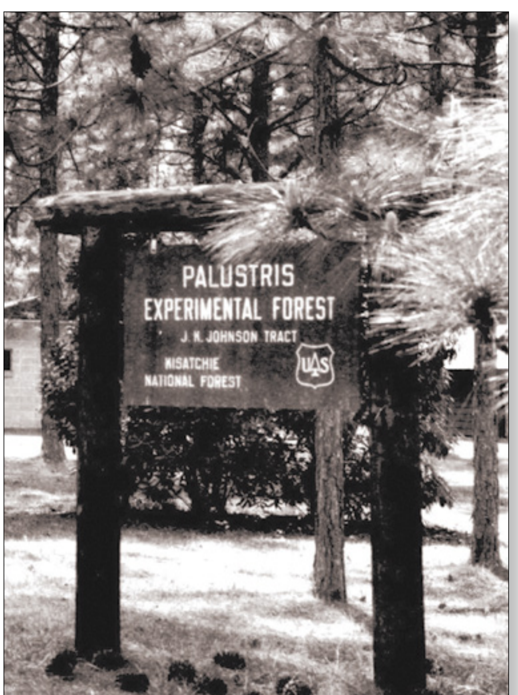
Name	Year initiated	Headquarters location	Original area *(acres)*
Camp Pinchot[1]	1936	Camp Pinchot, FL	Not listed
Chewalla	1936	Holly Springs, MS	2,500
Crossett	1934	Crossett, AR	1,680
Delta[2]	before 1939	Stoneville, MS	2,580
Harrison	1934	Saucier, MS	5,060
Hitchiti	before 1939	Round Oak, GA	4,735
Irons Fork	1936	Mena, AR	8,978
Olustee	1931	Olustee, FL	2,961
Palustris	1934	Pollock, LA	4,100
San Jacinto	1936	Huntsville, TX	2,150
Sylamore[3]	1933	Calico Rock, AR	2,800

[1] Camp Pinchot was listed in 1936 as an experimental forest to be developed but was not shown as such in 1939. In 1940, the entire Choctawhatchee National Forest, including Camp Pinchot, was turned over to the U.S. War Department and became Eglin Air Force Base.

[2] Operated in cooperation with the Mississippi Agricultural Experiment Station; it is unclear how much work was done here during this period.

[3] Technically, when the Sylamore Experimental Forest was established, it was part of the Central States Forest Experiment Station.

Sources: SOFES (1940, 1941).



Philip C. Wakeley was responsible for establishing the 2,500-acre Palustris Experimental Forest in 1935, later designed the K. Johnson Tract, to serve as an outplanting site for research studies conducted at the Stuart Nursery. Nearly 750,000 seedlings were outplanted in research studies on the forest during the 1930s. A 5,000-acre addition, named the Longleaf Tract was added to the forest in the mid-1950s, initially to support range research.

In these early years, experimental forests were dominated by silvicultural research related to the successful establishment, growth, yield, measurement, regeneration, and improvement of regional commercial timber species and their influence on watershed ecosystems. Over time, the value of experimental forests continued to grow. Having dedicated experimental forests became critical for the stability of research programs. As research programs changed, the need for some of the designated forests declined and they were closed; other events, such as World War II, also played a major role in the fates of some. Additional experimental forests were added over time, too, to support new programs.

The Stuart Nursery and reforestation research

One of the significant beneficiaries of the CCC and WPA was the SOFES's reforestation work. When the Great Southern Lumber Company at Bogalusa had cleared its last virgin longleaf pine and went into receivership during the Depression, the Station's reforestation research program that had been on their property was transferred to the village of Pollock in central Louisiana in 1934. Here the CCC was already providing support to the Kisatchie National Forest on a large tree seedling nursery (Carter and others 2015). Several nearby CCC camps, with 200 enrollees in each, helped build the Stuart Nursery and provided the needed workforce to grow and outplant pine seedlings (Barnett and Burns 2016). To support the development of this site, WPA employees designed and constructed offices, state-of-the-art cone and seed processing facilities, and equipment storage buildings. Starting from an old, abandoned farm in August of 1933, the Stuart Forest Nursery was designed to produce large volumes of seedlings quickly. From nearly 9 million longleaf, slash, and shortleaf pine seedlings produced in their first year of operations (Huberman 1935), the effort would eventually generate 25 million southern pine seedlings annually.

With funding from New Deal relief programs, the SOFES added significantly to its reforestation staff and expanded its work. For example, after years of limited help, the reforestation research program hired personnel to conduct studies at the Stuart Nursery and to evaluate seedling performance after outplanting (Wakeley 1980). During these years, Wakeley's staff planted nearly 750,000 seedings in research studies on the nearby Palustris Experimental Forest (Barnett and Burns 2016). The pioneering research done at the Stuart Nursery provided much of the information Wakeley used in the *Planting the Southern Pines* monograph that became the basis for the reforestation efforts across the South following World War II (Wakeley 1954).

Continued Southern Forest Survey and forest economics work

Remarkably enough, field work for the massive forest survey effort was completed in 1936; in 4 years the crews had completed the first systematic inventory of the South's forests. However, this was only the first step of the process. While Eldredge oversaw implementation of the first forest survey, he did not have the training or expertise to develop plans for the survey, nor for analyses of the data collected. Those tasks would fall to others, like Philip R. Wheeler, who directed various aspects of this important undertaking, and Robert K. Winters, who became primarily responsible for the publication of the data in the SOFES's Survey Releases (Eldredge 1935).

For more than a decade, a massive amount of useful information came from this forest survey data. The SOFES published 55 Forest Survey Releases during the period from 1934 to 1946 (SOFES 1946). These releases on results of the survey were eagerly sought and the survey's reputation was made and that of the Station enhanced (Barnett 2023b). Eldredge later commented: "the results were astounding… there was no idea of the amount of timber we had, how fast it was growing, how universally it was distributed, and what state of development it had reached… and that's what brought the pulp and paper industry south within the next few years" (Maunder 1977). The timing was impeccable as well; the South's forest survey started as interest in forestry was growing, and soon forest industry became the survey's best supporter. The forest survey probably had more to do with the expansion of the southern forest industry than any other project (Barnett 2023b). Although early SOFES foresters had predicted the economic potential of the developing forests on the economy the South (Bond 1933, Ziegler and Bond 1932), it was the forest survey data that provided the documentation needed to convince landowners and investors of the value of those forests.

As the Great Depression continued on, the forest survey and economics work continued to expand in an attempt to bolster local economies as well as the South's forest products industry. The economics of good versus poor management practices, including the relative profitability of trees of varying sizes, became an important line of research (SOFES 1933). Studies on the new public domain accumulating due to tax delinquencies remained a top priority, with a number of county-level case study projects to better document the specific circumstances of why some places had greater failure rates than others (SOFES 1933). By 1935, the Great Depression's depletion of Station resources led to reductions in some efforts, including limitations of forest economic efforts to certain regions and forest types. This also coincided with the establishment and development of a number of experimental forests that allowed for more detailed testing of some economic questions (SOFES 1936). Studies on taxes, the new public domain, and improving the economics of private forestry dominated the forest economics studies of the SOFES for the rest of this era.

Flood control surveys begin

The massive floods that affected much of the Ohio and Mississippi River valleys in early 1937 came just months after the passage of the Flood Control Act of 1936, which had started the Federal process of addressing the role of forest and farmland condition on influencing and regulating floods. The SOFES had a research line, called Forest Influences, that by this time had been investigating the major problems related to watershed protection, with an emphasis on stemming local erosion and bank stabilization projects using reforestation. In 1936, this less-than-a-decade-old program had limited staff but was starting to see more investment as the labor-intensive land reclamation work fit nicely with broader Federal work relief and farm improvement programs. This included the development of a new experimental forest, the Irons Fork in western Arkansas, to experimentally test a number of options in that forest environment. Extensive work was also being done in parts of northern Mississippi, which had suffered marked impacts in highly erodible loess soils affected by poor agricultural practices.

Starting in 1937, the SOFES received support to develop (and later expand) a major effort into a flood control survey project that would evaluate the conditions of a number of major watersheds in the region (e.g., Yazoo, Tombigbee, and Ouachita Rivers), with plans to expand into other watersheds (SOFES 1938). Over the next few years, the flood control survey program grew rapidly, so by the end of 1939, H.G. Meginnis (as lead of this program) had 24 persons reporting to him, several of whom were detailed to the SOFES from the Central States Forest Experiment Station (SOFES 1940). This explosive growth was dwarfed a year later, when the flood-control survey program staff list covered nearly two full pages and included 64 names (many of which were transfers from other stations or short-term detailers) (SOFES 1941). The flood control survey plans for 1941 were also ambitious, although global events soon curtailed this effort.

DEFENSE ERA AND WORLD WAR II: 1939–1945

After the German army overran Poland in 1939 and much of the rest of the world was engulfed by war, U.S. Government leaders began to gear up for America's inevitable involvement. The Army National Guard and the Reserves were mobilized, a draft was instituted, and Station employees began to leave for military service. These events led to a redistribution of Federal resources and alterations to Forest Service research priorities. For instance, the Irons Fork Experimental Forest, which had only recently been developed in the western Ouachita Mountains of Arkansas and formally established in 1940, lost most of the CCC and WPA workforce that had helped construct its infrastructure by 1941 (Bragg 2021a).

After the Japanese bombed Pearl Harbor and the United States entered the war, there was an immediate and drastic change in the focus of all Federal Government programs to outcomes that would support the war effort. For the Station, the work changed to gathering information about supplies, output, and requirements of forest products for defense for the War Production Board, among other projects. Station employees developed Russian dandelion (*Taraxacum kok-saghyz*) and goldenrod (*Oligoneuron* spp.) plants in nurseries for rubber production, worked to free airfields of undesirable vegetation, and measured infiltration rates related to airfield drainage. Other projects focused on improving camouflage for military installations, evaluating priority requests for logging and milling equipment, improving fire protection of critical areas, and controlling termites and decay in wood structures (Josephson 1989, Wheeler 1963).

During the early to mid-1940s, as people left the SOFES for military service or to support other aspects of the war effort, the remaining staff spread their efforts to continue some measurements and consolidated existing research. Even during the war years, legislation was passed to harvest sustainably, increase cooperative fire protection, and keep the forest surveys up to date (USDA Forest Service 1976). Furthermore, plant pathologists learned how carefully planned prescribed burns could control brown-spot needle blight (*Mycosphaerella dearnessii*), the worst disease of longleaf pine (Siggers 1945). A few SOFES research programs were able to grow their existing operations, as they were deemed consistent with war needs. For instance, the naval stores research program expanded. To increase production of gum naval stores for war needs, the Station intensified experiments with chemical stimulation of resin flow, and revolutionized naval stores techniques by introducing additional developments in this field (Barnett 2019). Efforts were made to increase logging production, but logging methods that left trees for future use and wasted as little as possible were also encouraged. Work on increasing pine wood production for supporting war industries also grew; for instance, in March 1942 the Crossett Experimental Forest (CEF) added 1,800 acres via a new lease with the Crossett Lumber Company to study even-aged southern pine silviculture.

“*Even during the war years, legislation was passed to harvest sustainably, increase cooperative fire protection, and keep the forest surveys up to date (USDA Forest Service 1976).*

The suspension of pre-war activities came at a cost: experimental forests were often neglected, temporarily closed, or even turned over to the military. Wakeley (1971) noted that of 750,000 seedlings planted in research studies on the Palustris Experimental Forest during the CCC era, all but 50,000 were destroyed by fire and hogs during the war years. SOFES programs such as forest influences research on topics such as road bank stabilization was shelved and the remaining research staff focused on projects related to the war effort (SOFES 1942). This ultimately led to the demise of the newly established Irons Fork Experimental Forest, which though not disestablished as an experimental forest until 1969, did not have its studies restarted nor was it ever staffed again (Bragg 2021a). Camp Pinchot and the rest of the Choctawhatchee National Forest in the panhandle of Florida were turned over to the U.S. War Department in 1940 and became Eglin Air Force Base.

Another major transition for the SOFES occurred when its long-time Station Director E.L. Demmon departed in 1944 to become station director of the Lake States Forest Experiment Station. During his 17 years as SOFES director, Demmon

Boundaries of the various Forest Service experiment stations in 1936 (top) compared to those in 1947 (bottom) following a major realignment in 1946. At that time, the Appalachian Forest Experiment Station name was changed to the Southeastern Forest Experiment Station.

had contributed to both the administration and research efforts of the Station. One of his major efforts over this period was to argue for fire suppression and against the use of burning in forests. In Demmon's mind, fire had too few redeeming qualities and too many negative consequences for standing timber to justify its application as a management tool. Unlike many station directors, Demmon published frequently and on a range of topics; although not typically in scientific outlets, his written contributions (nearly 70 during the time he was with the SOFES) helped to translate the Station's research into usable findings for landowners, managers, and policymakers. Demmon's successor, Charles A. Connaughton, would continue some of that station director-level involvement during his tenure.[3]

ERA OF TERRITORIAL RESEARCH: 1946–1959

The position of station director remained somewhat unsettled after Demmon's departure. His immediate replacement, Connaughton, served until June 1951 when he transitioned into the regional forester position in the Southern Region. Connaughton's replacement, Harold L. Mitchell, had been the director of the Central States Forest Experiment Station. Mitchell had worked at the Lake City, FL, naval stores research location of the SOFES during World War II until he became the Central States director in 1946. Mitchell left the SOFES to take charge of the Division of Silvicultural Relations at the Forest Service's Forest Products Laboratory in Madison, WI, in November 1953. Philip R. Wheeler served as acting station director until early 1954 when Philip A. Briegleb, former head of the Central States Forest Experiment Station, became SOFES director (SOFES 1954). Briegleb would remain in this position well into the next era of the SOFES.

This succession of station directors faced some considerable organizational challenges during this era. Toward the end of World War II, Forest Service research administrators in the Washington Office had evaluated the structure and function of their organization. One change involved developing a staff structure more like that of the military. Another outcome of this reorganization and the Station's programmatic growth was a significant realignment of the boundaries between the SOFES and the Appalachian Forest Experiment Stations in 1946. Prewar experience had demonstrated the difficulty in administrating the SOFES, which extended from coastal South Carolina to the prairies of central Texas. Traveling from the New Orleans headquarters to the eastern portion of the Station was difficult and time consuming. Following the 1946 reorganization, SOFES research in most of Florida and all of Georgia was transferred to the newly christened Southeastern Forest Experiment Station (SEFES), while the SOFES received northern Arkansas from the Central States Forest Experiment Station and Tennessee from the Central States and Appalachian Stations.

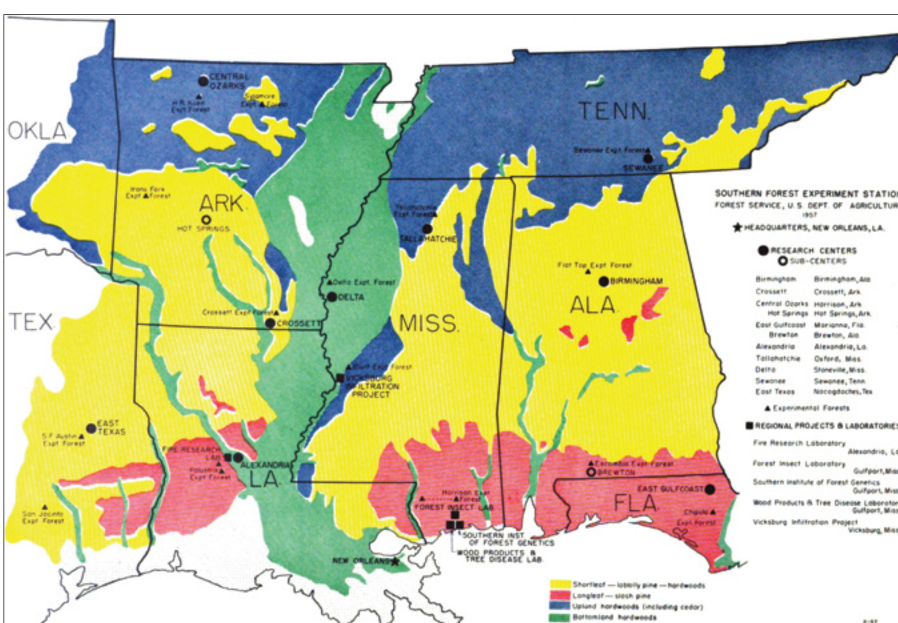
This new arrangement divided the southern pine forests of the coastal plain states between the two stations, which eventually resulted in some research coordination issues. A major loss for the SOFES was the transfer of ongoing naval stores research in Florida to the SEFES (Connaughton 1946). Because naval stores was such a major industry in the Southeastern United States, the SEFES would continue this line of research for another 4 decades (Barnett 2019).

[3] Demmon would later return to the South as the director of the Southeastern Forest Experiment Station between 1951 and his retirement from the agency in 1956.

Even with this change in boundaries, the SOFES had grown appreciably from the institution's humble beginnings in 1921. Even though a few of the Station's experimental forests remained inactive after 1945, the SOFES still had a number in place (table 2), including the San Jacinto (eastern Texas); the Palustris (Louisiana); the Crossett, Irons Fork, and Sylamore (Arkansas); the Delta, Harrison, and Chewalla (Mississippi); and the Escambia (Alabama). The Station further developed facilities and research programs at a number of these experimental forests after the war, with capacity enhancements in the office buildings (including a fireproof safe) added in 1946–47 to the existing administrative site at the CEF. At the Palustris Experimental Forest, residences with supporting laboratory and workspaces were built on both the J.T. Johnson and Longleaf Tracts in the 1950s.

Growth in experimental forests and research centers

Additional experimental forests and supporting research locations were added during the Era of Territorial Research. By 1957, the SOFES had established new experimental forests and research centers in northern Arkansas (the Henry R. Koen Experimental Forest and Central Ozarks Center, with staff in Harrison and Hot Springs), central Louisiana (Alexandria Research Center), northern Mississippi (Tallahatchie Experimental Forest in Oxford), west-central Mississippi (Delta Experimental Forest in Stoneville and the Bluff Experimental Forest and Vicksburg Infiltration Project in Vicksburg), southern Mississippi (Forest Insect Laboratory, Southern Institute of Forest Genetics, and Wood Products and Tree Disease Laboratory, all in Gulfport), southern Alabama (Escambia Experimental Forest in Brewton), northern Alabama (Flat Top Experimental Forest and Birmingham Center in Birmingham), western Florida (East Gulfcoast Center and Chipola Experimental Forest in Marianna), and southern Tennessee (Sewanee Experimental Forest in Sewanee).



Forest types and research locations in the territory of the Southern Forest Experiment Station, 1957.

While most States saw increases in the Station's footprint, Mississippi had seen a particularly large increase in SOFES research projects, with some additional shuffling. For instance, the Chewalla Experimental Forest closed and was replaced by the Tallahatchie Experimental Forest. The Station constructed a new facility on the USDA complex in Stoneville, added the Bluff Experimental Forest and work on water infiltration into forest soils in Vicksburg, and built a large new office and laboratory facility in Gulfport to support several projects, including the increasingly prominent Southern Institute of Forest Genetics.

In addition to the Station's infrastructure, support for research programs continued to expand. Post-war economic growth enabled landowners to put large tracts of forest under intensive management. Not surprisingly, then, this era also witnessed the dramatically increased participation in forest research by State and private agencies and educational institutions. Until then, the Forest Service had conducted nearly all forest-related research. Between 1949 and 1952, nonfederal expenditures for forest management research in the South increased 55 percent (Federal expenditures remained unchanged during this period). Between 1953 and 1961, however, Federal research expenditures in the South increased about 75 percent (Demmon and Briegleb 1956).

Around 1945, the Forest Farmers Association Cooperative of Valdosta, GA, spearheaded a drive for a more comprehensive Federal research program to meet the increasing demands of forestry interests in the South. This move resulted in setting up about 20 research centers covering most of the forested area of the South (see also Demmon and Briegleb 1956). With the aid of local advisory committees and the cooperation of local organizations, these research centers became a major force in the technical advancement of southern forestry. The field research centers emphasized the most critical research needs of their surrounding territory. For example, the area served by the Alexandria Research Center in central Louisiana was better suited to grow timber than to any other land use (Cassady and Mann 1954). This meant that the development and prosperity of the region depended upon reforestation and improved stand management. The most pressing need was to get the huge area—over 7.1 million cutover acres in Louisiana and Texas alone—back into high production quickly and at a reasonable cost (reforestation would soon triple the South's pine timber production). Because most of this area was also used for grazing by open-range livestock, forest range improvement became an additional research focus.

Composed of a large and diverse scientific staff, these research centers were encouraged to establish research advisory committees to help develop science priorities. These local committees comprised the leading professional foresters, forest landowners, forest products manufacturers, and agricultural extension agents, tasked to help guide the research direction of the center (Committee on Government Operations 1956). Widely implemented across the USDA, these advisory committees became sources of political support for their programs and helped develop funding for program and facility improvements. The influence of some of these committees was sometimes so great that they could (and were) used to supervene the direction of station administrators (Barnett 2004).

The Alexandria Research Center advisory committee in the mid-1950s. Kneeling are Southern Forest Experiment Station staff, from left: J.T. Cassady, H.H. Muntz, F.A. Peevy, O.G. Langdon, D.O. Dryden, J. Williamson, A.E. Tassin, and H.J. Derr. Committee members standing from left: G.B. Hartmen, Long Bell Lumber; H.S. Redding, Kisatchie National Forest Supervisor; J.E. Mixon, Louisiana State Forester; P.E. King, Industrial Lumber Company; R.W. Hayes, Louisiana State University, School of Forestry; J.F. Kellogg, Consulting Forester; J.W. Duty, USDA Extension Service.

Expansion of research programs into new disciplinary areas

The forestry principles that the SOFES developed and advocated for were put into widespread practice. For example, improvements in forest management such as direct seeding and plotless timber cruising continued to increase the value of the forest resource of the South. With this success came new challenges, needs, and expectations. In addition to silviculture, other Station research centers emphasized forest survey, prescribed burning, bottomland hardwoods, pine-hardwood stands, forest range management, watershed management, and control of low-grade hardwoods (Connaughton 1946), and later forest genetics, wood products, forest influences (soils and erosion), forest health (insects and diseases), economics, and wildlife management. The expanded SOFES research programs included an increased emphasis on both identifying and solving problems as well as touting the rewards of protecting forest resources.

However, because these centers were geographically distant and their leaders tended to protect their turf, there was little coordination among them. Coordination issues also arose at a larger scale, a problem that would persist well into the future. The SOFES and SEFES were working with the same southern species and also needed to coordinate their research programs. Each station had an assistant director for planning and application and a portion of this person's responsibility was to coordinate research between the two stations. To do this, research efforts were formalized and summaries of research study plans and reports were routed between them, helping to leverage their efforts and prevent duplication of research.

Although the SOFES had expanded its capacity for science, it was still necessary to work in concert with other institutions and organizations to expand forestry research. A good example of this included the development of southern tree improvement research. In addition to the leadership of the SOFES (centered at Gulfport, MS, but also at field locations such as the CEF), this effort also included private industry and universities. These were all coordinated by the Southern Forest Tree Improvement program which represented all interests in the research

(Wakeley 1957). Demmon and Briegleb (1956) summarized the situation at the end of this era by the statement,

> *how can we best obtain[the] … benefits that our 200 million-acre forest heritage can supply? … [by providing] the knowledge needed to succeed in this quest … The potential rewards are impressive, as is the determination of our people—forest owners, industries, research workers, and all—to do the job.*

Absorption of other USDA bureau staff

Another part of the agency's effort to streamline and improve station research was co-locating staff from other USDA bureaus at Forest Service research locations. By at least October of 1925, the AFES had two entomologists (R.A. St. George and A.H. McAndrews) from USDA's Bureau of Entomology and a pathologist (C.J. Humphrey) from USDA's Bureau of Plant Industry working in Asheville on forest-related problems. The SOFES was slower to have staff from those bureaus, but by October of 1928, the SOFES also had forest pathologists R.M. Lindgren and Paul V. Siggers from USDA's Bureau of Plant Industry working with them in the New Orleans office. During the decades that followed, a number of other scientists and support staff with these other USDA bureaus (the names of these bureaus and their focus changed somewhat over the years) continued to conduct research on entomological and pathological issues. Organizationally, because the entomological and pathological research specialties were found in these other USDA bureaus, they could not be filled by Forest Service staff. This changed in the early 1950s under a series of USDA reorganizations; by early 1954, the entomologists and pathologists of these former bureaus officially became Forest Service employees and continued their research careers at their respective forest experiment stations. Such transfers boosted the size and scope of Forest Service research in the South and helped to make it a more integrated part of southern forest science.

ERA OF RENEWED FUNCTIONAL RESEARCH: 1960–1980

Forestry research during the Cold War

Partners against fascism during World War II, the United States and its allies soon faced a new threat to their security: communism in eastern Europe, parts of Asia, and even the Americas. While much of this new Cold War revolved around nuclear and conventional military threats, these opposing camps also competed in other aspects of society, including research and development. For example, the American space program began in 1957 with the Soviet Union's launch of the first artificial satellite—a small beach ball-sized creation called Sputnik. This event took place under the backdrop of the Cold War and was seen as a threat to American security (Howell 2020). Within 5 years, new satellites were developed, both Soviet and American astronauts had been launched into space, and planning for lunar landing programs was underway.

The space race was also a way for a broad array of Federal agencies to boost their public relations, even if their core missions were only tangentially associated with space. Such was the case for the Forest Service's participation in the Moon Tree project. In 1970, then Forest Service Chief Ed Cliff approached Lt. Colonel Stuart

Roosa about taking seeds from a number of tree species into space with him when he commanded the Apollo 14 moon mission in early 1971. Roosa had been a smokejumper for the agency in the Western United States many years earlier. This effort, in large part public relations (and a small part science), eventually involved the SOFES. After their trip to space, the loblolly pine, sweetgum (*Liquidambar styraciflua*), and sycamore (*Platanus occidentalis*) seeds were germinated at NASA facilities in Houston, TX, and grown at the Southern Institute of Forest Genetics in May 1971. A few of these germinants—now dubbed "Moon Trees," since they orbited the moon as seeds—were planted at the Palustris Experimental Forest and the G.W. Andrews Forestry Sciences Laboratory.[4]

Such public relations efforts of the agency aside, the decades from 1960 to 1980 could be considered a golden era of southern forestry science. Federal forestry research blossomed during this era, thanks to considerable increases in science funding, during the late 1950s and early 1960s. Forest Service research efforts were also widely supported by forest industry, State governments, and universities. The SOFES's research program peaked both in the number of scientists and scope of the research agenda during this era. Research products were developed and put into immediate use by forest industry and other land managers. As the SOFES's funding support and research programs grew, each research center staff expanded to include more disciplines. For example, though the Alexandria Research Center in Louisiana was primarily focused on a reforestation mission and managed by a silviculturist, the staff expanded to include one or more from the following specialties: silviculturist, range specialist, botanist, plant physiologist, entomologist, geneticist, wood technologist, and wildlife specialist.

"... the decades from 1960 to 1980 could be considered a golden era of southern forestry science. Federal forestry research blossomed during this era ... research products were developed and put into immediate use by forest industry and other land managers.

This was not just a golden era for the SOFES, as research staff were being developed by some of the major forest industries and university research became an important contributor to forest science needs (Carter and others 2015). Collaborations, which included Forest Service researchers, developed in part through the establishment of cooperatives that shared common research and management agendas, were primarily focused on increasing forest yields. Examples of such efforts included cooperatives for tree improvement, nursery production, stand growth and yield, and stand fertilization.

Forest Service research reorganization

Although Forest Service research programs benefited from the growth of the previous era, it became increasingly evident that the SOFES's post-war organization was ill-suited for this expansion and the Station's center-based territorial approach had lost much of its effectiveness. By the late 1950s, the Forest Service research and development program began shifting away from center-based work to one organized around research projects (Williams 2000). In 1962, a major restructuring of the SOFES's research and development program was announced (SOFES 1963). Under this reorganization, the territorial research center concept was replaced by smaller research work units (RWUs), each with a narrower research focus. A total of about 20 RWUs were established by the

[4] Most of the information on the Moon Trees came from a 1971 letter from the Director of Timber Management Research, Carl E. Ostrom to SOFES Director R.L. Youngs and the NASA website: https://nssdc.gsfc.nasa.gov/planetary/lunar/moon_tree.html.

Station (Josephson 1989). Structurally, RWUs consisted of a project leader who supervised the program of study with a small number of scientists and support staff who worked on specific research assignments. At a higher level, the SOFES was administered through assistant station directors who reported to the station director. Each assistant director was responsible for supervising the technical research programs of five or six RWUs based on a combination of geographic and disciplinary criteria.

As the new RWUs were established, Washington Office and station leadership exerted more programmatic control, both by banning the hosting of research advisory committees as well as any contact with congressional legislators without permission. The diminished ability to develop rapport with congressional staff limited local Forest Service units from building congressional clout. This eased administrative problems for station leadership but became a problem years later when support was needed to maintain forestry research programs.

"The placement of the Louisiana-based offices of the three branches in one facility that was not on a university campus, have them share services, and develop close collaboration was a good trial of a unified organizational structure.

Alexandria Forestry Center: a trial in collaboration—During this era, Forest Service Chief Richard McArdle advocated for the establishment of RWUs at universities, which he thought would make them more productive. SOFES administrators offered a different model to consider in the pineywoods of central Louisiana. The national reorganization of the Forest Service research program in the early 1960s offered a unique opportunity in Pineville—why not take advantage of adequate congressional funding to locate all of the agency's branches together in one facility? Most likely, it was someone in the Washington Office, along with the support of the Southern Region's regional forester and the SOFES station director, who convinced Chief McArdle to allow for their colocation. The placement of the Louisiana-based offices of the three branches in one facility that was not on a university campus, have them share services, and develop close collaboration was a good trial of a unified organizational structure. It helped that a forestry triumvirate consisting of the Alexandria Research Center leader, forest industry under the banner of the Louisiana Forestry Association's executive director, and Louisiana Forestry Commission's state forester had developed sufficient political support in Washington to fund a new Forest Service research facility patterned after the agency's Forest Products Laboratory in Madison, WI (Barnett 2018, 2020).

No doubt, there had long been a real need to improve the agency's facilities and organization in the area. When the SOFES established a more formal research presence in the central Louisiana area just after the end of World War II, it took advantage of earlier work that had been done in the region at places like Urania, the Stuart Nursery, and the Palustris Experimental Forest (Cassady and Mann 1954). However, the SOFES's Alexandria Research Center and the Kisatchie National Forest (KNF) were both housed in inadequate rental space. To address this, a facility called the Alexandria Forestry Center (AFC) was developed to include a large complex of new research offices, laboratories, and support service buildings. A 14-acre site was obtained from Federal Government surplus at the Alexandria Veterans Administration Hospital. The AFC included a renovated three-story building (used as a nurses' quarters in the 1920s) to serve as the administrative offices for the KNF Supervisor's Office and the Forest Service's State and Private Forestry, Forest Health Protection (FHP) staff.

Above: The renovated Alexandria Forestry Center administrative office building for the Kisatchie National Forest and Forest Health Protection of State and Private Forestry.

Left: The Alexandria Forestry Center (AFC) campus at the time of its dedication (some facilities were still under construction). The complex of buildings at the top of this image is the Alexandria Veterans Administration hospital; the clear span building on the AFC campus is to the far right.

In addition to this renovated office building, new facilities were also constructed. Research facilities proved to be the largest component of the forestry center. These included a large office and laboratory building to house SOFES research units[5] and numerous research support structures, such as a headhouse and two greenhouses, a research insectary, a large clear span building with state-of-the-art equipment for

[5] The SOFES housed five separate RWUs at the AFC. These included Timber Management Research (later redesigned as Forest Management Research, or FMR), Forest Insect Research, Range Management Research, Forest Products Utilization Research, and Fire Behavior Research. However, the Fire Behavior RWU was transferred shortly after establishment because this research was consolidated into two national centers in Missoula, Montana, and Dry Creek (Macon), Georgia, both of which continued for decades. In its place, another FMR RWU was established at the AFC in 1969 that focused on intensive silviculture of southern pines. This was in part due to transfer of staff and projects from the closing projects at the Crossett Experimental Forest. The mission of this unit was to integrate the effects of fertilization, irrigation, tree improvement, and soil modification to optimize the productivity of southern pine forests (Shoulders 1967a, 1967b).

Forest Service Chief **Ed Cliff** speaking at the dedication of the Alexandria Forestry Center in September 1964.

wood utilization testing, and several other service buildings. Although parts of the AFC were still under construction, the facility was dedicated in September 1964 in a ceremony attended by many dignitaries including Forest Service Chief Ed Cliff.

To make this unified facility work, the AFC would be managed by a steering committee consisting of a representative from the KNF, FHP, and SOFES, with the chairperson rotating annually. The research representative would be named by the station director and typically was the most senior project leader, but sometimes this duty rotated among project leaders. The committee was scheduled to meet quarterly, and a major agenda item was distributing operational costs of managing the facility among the three organizations. The cost for shared administrative services at the AFC was distributed by the number of employees in each operating unit and facility and operational costs were allocated by the square footage of space occupied by that unit. Shared reception, contracting, and personnel responsibilities were provided by the KNF administrative officer and personnel officer (all personnel records were maintained by KNF). Facility operation and maintenance responsibilities were originally provided by a contract with the General Services Administration (GSA) and then the SOFES research units assumed responsibility for the facility management personnel. Eventually, it became more efficient for the KNF engineering staff to assume this responsibility.

Initially, some turf protection issues between KNF and SOFES leadership remained. But after a visit by the regional forester and station director, those issues were resolved. The shared services experiment worked well, and all the units involved began to appreciate the benefits of the effort. For example, the opportunity for SOFES employees to sit down with their personnel or contracting officers and resolve problems locally was effective and greatly appreciated. The interaction of SOFES, KNF, and FHP employees stimulated collaboration among both management and research programs, enhanced organizational productivity, and built esprit de corps. V.L. Harper, Deputy Chief for Research, praised the AFC complex as “one of the nation’s most productive” (Alexandria Daily Town Talk 1964). After a visit to the AFC, Chief McArdle also noted the high productivity of the AFC, and that the colocation had resulted in significant benefits to the entire Forest Service.

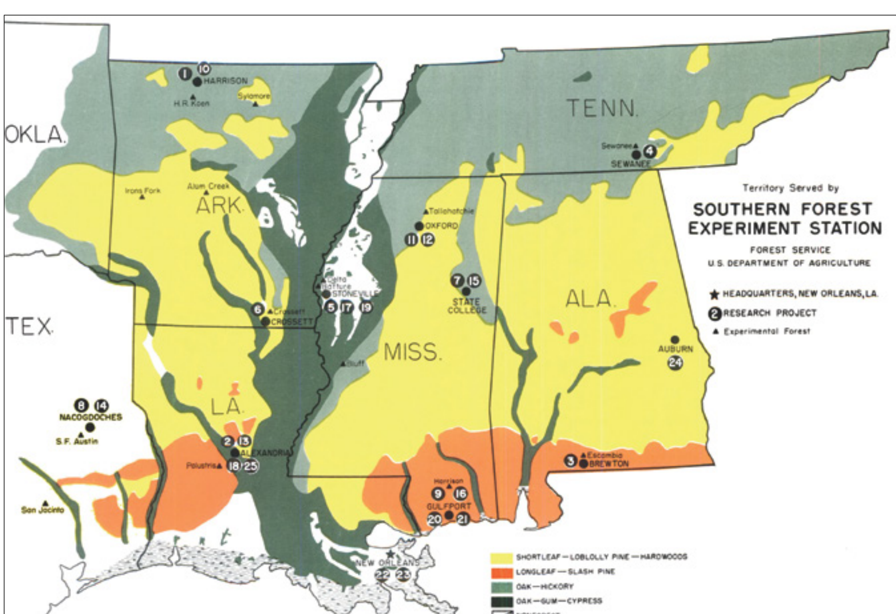
This effective integration at the AFC proved itself repeatedly over the years. For instance, in 1973, two chronic forest insect problems in the Eastern United States, spongy (formerly gypsy) moth (*Lymantria dispar*) and southern pine beetle (*Dendroctonus frontalis*) were sufficiently severe to become a national concern. As a result, in 1974 Congress passed legislation funding a 5-year, multi-agency research program to address these insect pest problems. The Southern Pine Beetle Research and Application Program was located at the AFC. Led by Program Manager Robert C. Thatcher, the program developed a close relationship with the Forest Insect RWU and funded cooperative research with numerous university scientists across the South. Due to insufficient office and laboratory space to house the new program’s specialists at the AFC, portable buildings were installed on the site (these temporary buildings were removed after the Southern Pine Beetle Program ended). In addition to producing many publications and a final report (Thatcher and others 1981), this program further showcased the Pineville location as a prominent center for forestry science and its application in the South.

Other research units and programs

While the RWUs at the AFC in Pineville were the SOFES's largest combined research effort at that time, other significant efforts were located across the Station's territory. By the late 1960s, SOFES research projects were located at Auburn, Brewton, and Tuskegee, AL; Sewanee, TN; Gulfport, Oxford, State College (Starkville), and Stoneville, MS; Pineville (AFC) and New Orleans, LA; Crossett and Harrison, AR; and Nacogdoches, TX.

While all SOFES locations housed multiple research projects within any given RWU, other large multiunit locations (such as those in New Orleans, Gulfport, and Stoneville) became the preferred model. For instance, in addition to being SOFES administrative headquarters, the New Orleans location had RWUs with assignments in economics, forest survey, and statistics (originally a support function, then developing into a formal unit). At Gulfport, the assignments were pine tree improvement and genetics, diseases of conifers, and protection of wood from termites. At Stoneville, the focus in three units was on the silviculture, insects, and diseases of hardwoods. In the late 1960s, the SOFES began a partnership with the Tuskegee Institute in Tuskegee, AL, to help develop the first forestry program at a historically black college to help address a grievous underrepresentation (only 0.3 percent at that time) of African Americans in the American forestry profession (USDA Forest Service 1970).

This staff and programmatic growth during this era also spurred a new building boom by the SOFES. In addition to the 1964 opening of the AFC in Louisiana, facilities to house researchers, support staff, and laboratories were built or expanded upon in the early 1960s at the CEF; in 1968 and 1969 in Oxford and Starkville, MS, respectively (USDA Forest Service 1969); in Nacogdoches, TX, in 1971 (USDA Forest Service 1971c); and in Auburn, AL, in 1975. According to a National Science Foundation report, as of June 1969, the SOFES had 105 research professionals (scientists, engineers, and any other staff primarily engaged in R&D



Distribution of research projects and experimental forests of the Southern Forest Experiment Station, 1969.

activities) and 188 other personnel (all other types of support staff), with a budget of just over $4.8 million (National Science Foundation 1970).

However, not all locations thrived during this era. Even with new facilities added earlier in the 1960s, the CEF underwent a decade of turmoil starting with the January 1, 1969, retirement of longtime Project Leader Russell R. Reynolds. Although the CEF had been a highly successful research location since it opened 35 years earlier, its research focus had long concentrated on naturally regenerated southern pine forests (especially using uneven-aged silviculture), which had started to fade in practice across much of the South after World War II. By the late 1960s, the SOFES had started pushing to end research at Crossett. When Reynolds retired, the last major obstacle to winding down CEF was removed, and the SOFES began to close studies and reassign CEF staff to other projects and locations. By 1974, Research Geneticist Hoy Grigsby was the last local SOFES staff member (allowed to remain due to his impending retirement) and the last remaining silviculture and tree improvement studies were closed or transferred to distant supervisors in Pineville or Gulfport, MS.

Unwilling to see decades of work at Crossett mothballed, the retired Reynolds and the forestry staff with Georgia-Pacific (who had purchased the Crossett Lumber Company, the CEF's primary industry partner and lease holder for the CEF lands) sought to convince the Forest Service to resume research activities. After years of internal debate, the agency agreed to restart work at the CEF, and by early 1979 had started restaffing the location. In a sort of compromise to meet Station preferences for administering its science programs, SOFES scientists would not be stationed at Crossett, but rather co-located with the forestry program at the University of Arkansas-Monticello about an hour away. Field technicians and other research support staff were stationed at Crossett and would help develop a new program focusing on supporting the forest management needs of small private landowners.

Front and back of logo for the Southern Forest Experiment Station 50th anniversary, celebrated in 1971.

Other events

50th anniversary of the Station—In 1971, the SOFES held a celebration of the 50th anniversary of the Station. Celebrations were planned for the New Orleans headquarters and the major field offices. At the time, the SOFES had grown to more than 100 scientists and 250 supporting personnel in laboratories scattered across its territory. Colloquially stated, the Station's research program was aimed at producing wood for American consumers, protecting forests against fire and pests, managing forested watersheds, providing forage for cattle and wildlife, opening and expanding forest products markets, and developing the recreation potential of forest land (USDA Forest Service 1971b).

To commemorate the occasion, an eight-page issue of the SOFES research update periodical was published that provided some of the history and early accomplishments of the Station, a vision of the future direction, and documentation by use of photos of former staff members who contributed so much to the early accomplishments of the Station (USDA Forest Service 1971b). The photos were printed with names below them, nothing more, but by their work they were remembered. It was also interesting that all the Station's directors to that point were still alive and able to gather for this commemoration; a picture of them appeared in the fall issue of that same periodical (USDA Forest Service 1971a).

Tower system on the Palustris Experimental Forest provides access to the crowns of loblolly pines to evaluate physiology in response to stand management treatments in support of climate change initiatives.

Biennial Southern Silvicultural Research Conference—In 1979, the Biennial Southern Silvicultural Research Conference (BSSRC) was developed to further improve coordination between the SOFES and SEFES and to build collaboration with forest industry, national forests, and university specialists (Barnett 2020). The first BSSRC was held in 1980 and the conference has been held biennially (to at least 2021). The BSSRC continues to be a highly regarded venue for coordinating research and meeting the needs of both research and management professionals, and a proceedings has been published with each conference to help build silvicultural knowledge in the South.

State and Private Forestry professional workshops—In the early 1970s, the Forest Service's State and Private Forestry (S&PF) deputy area began recruiting technology transfer specialists to help communicate the latest in research developments to forest industries, state organizations, and national forest land managers. Examples of this initiative include southern tree nursery workshops and tree improvement conferences. These meetings have been held biennially with published proceedings. To accomplish these efforts, the S&PF specialists partnered with the appropriate SOFES and SEFES research units and the Southern Region's forest management specialists.

In addition, the S&PF specialists helped develop other outlets for communicating the Station's research findings over the years, such as the *Tree Planters' Notes* publication for reforestation efforts. Other approaches of the SOFES in support of technology transfer included developing plans for individual tree species restoration. For example, Roger Dennington was one of the S&PF staff in Atlanta who led the effort in support of longleaf pine restoration. Working with Station scientists, this effort included driving tours on several experimental forests to provide information on the principles for restoring longleaf pine. These tours summarized current technology on regeneration, management, and utilization of longleaf pine, and promoted the species as an integral part of southern forestry.

ERA OF RESEARCH MATURATION: 1981–1992

While the previous era was one of tremendous advancement in all fields of forest science, the research maturation period represented the pinnacle of the SOFES's history. With adequate funding and excellent facilities, Station scientists made dramatic progress after 1960 in restoring the southern forests to a highly productive condition and in developing wood products for forest industry. There remained, however, even greater opportunities to understand the biology required to maximize the productivity of these new forests while maintaining other ecosystem values. This included the ability to use new technology to study the South's forests.

Station research had helped to rehabilitate the South's cutover forest land and make it productive again in a remarkably short period of time. A remarkable coalition of SOFES scientists, private industry foresters, and S&PF and university specialists developed southern forests into the most productive timber-growing region in the world and a major driver of the South's economy. Although research supporting these forest productivity and wood utilization efforts continued to provide for and refine this technology, the need for new initiatives became obvious. The questions coming up were equally or more difficult and public pressure began to steadily increase.

The evolving world of southern forest science

As shifts in the research program were instituted, support for forestry research in general began to decline. In a study of forestry research by the National Research Council (NRC) of the National Academy of Sciences, it became obvious that congressional support for forest research was declining (National Research Council 1990). To help overcome this deficiency, NRC recommended that a new research paradigm focused on the environment be adopted. Even though previous approaches to forestry research employing the conservation and preservation paradigms had been adequate to meet many past forest management goals, NRC considered them inadequate to guide forestry research into the future and called for major changes to how forestry research was organized, managed, and funded. The adoption of an environmental paradigm required forestry research areas to increase in both breadth and depth.

For example, new guidelines were being developed for managing the restored forests of the South. Timber harvesting and development of land for urban use increased substantially across the region, leading to questions about the health, productivity, and long-term sustainability of the forests (Wear and Greis 2004). This angle was relatively new to the SOFES; Forest Service scientists had long provided feedback and information on standard silvicultural practices on national forest lands (e.g., Burns 1989). While not always as vocal as other parts of America, Southerners also began rating environmental protection and noneconomic values of trees as top priorities to be considered on the same footing as the more traditional commercial uses of the forest. For example, urban pressures threatened to take far more forest out of sustainable management than land use conversion. Forest science then began to seek new ways to manage forests and communicate the value of that management in ways acceptable to urban neighbors (Sampson 2004). Efforts to evaluate the effects of climate change on forests, advancements in clonal and molecular genetics, the need for new forest products, the adverse effects of invasive species, protection for endangered species, and improvements in reforestation technology also began during this era.

As with much of the rest of the United States, forests in the South were touched by a number of environmental challenges during the 1980s and 1990s. The clearcutting controversies of national forests in the Western United States and West Virginia during the 1960s and 1970s led to the passage of major legislation that affected management practices nationwide (Williams 2000). Changes to Federal land policies and laws passed to protect wilderness, endangered species, clean water, cultural resources, and air quality during this era likewise had major impacts on national forest management. Consequently, affected land managers sought assistance from the SOFES to learn how to steward their timber and these other resources. Many examples of supporting research could be highlighted; the following are just a brief set of examples.

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Red-cockaded woodpeckers and endangered species research—The 1973 passage of the landmark Endangered Species Act (ESA) slowly started to impact public land management in the Southern United States. While the SOFES had studied aspects of game species and their management for decades by the early 1970s (Josephson 1989), the ESA affected a much broader sweep of species and habitats, with potentially important repercussions for forest management practices. The first, and likely most prominent southern species to become a controversy and the focus of SOFES research following the passage of the ESA was the evaluation and listing of the red-cockaded woodpecker (*Dryobates borealis*, RCW). The RCW depends on open, frequently burned old southern pine forests with large, live pines with advanced heartrot to provide foraging and nesting habitat. Such forests were once abundantly distributed across the Southern United States. By the early 1970s, decades of intensive silvicultural practices that led to more closed canopy forests with dense midstories, smaller, younger, healthier pine trees, along with reduced frequency of surface fires, had greatly reduced RCW habitat and its population had plummeted. Because some of the best remaining RCW habitat was found on public lands, especially military bases and national forests across the Coastal Plain, these lands were immediately placed in the spotlight when RCW was listed as an endangered species.

SOFES scientists were engaged early in the efforts to study RCW and the factors that led to its listing. During the 1980s and early 1990s, Station scientists Drs. Dick Conner and Craig Rudolph conducted key research in the biology and ecology of RCW in eastern Texas, including how management practices influenced the population dynamics of this endangered species (Conner and others 2001, Kulhavy and others 1995). The results of Conner and Rudolph’s research, plus that of many other people across the region apparently succeeded in halting the decline of this species and encouraged a modest recovery, although the necessary changes to silvicultural practices on both public and private lands led to considerable concerns from land managers (concerns that linger to the present day).

Old-growth guidance for the Eastern United States—A major effort during the late 1980s into the 1990s involved Forest Service research stations in the Eastern United States working with the Southern and Eastern Regions of the National Forest System to develop guidelines for handling old-growth forests on public lands. This work followed a national reckoning on Forest Service land management practices that emerged during the 1980s around a number of topics, including timber harvesting, endangered species, mineral extraction, grazing, recreation, and old-growth forests. While the old-growth issue was largely one seen for the national forests in the Western United States, which still had large blocks of uncut old-growth timber being harvested, it was not absent from the much more heavily cutover Eastern United States. Loss of most of the frequently burned, open old-growth longleaf pine forests in the South had contributed significantly to declines of RCW and other species dependent on that stand condition, making the remnant stands all the more important (James 1995). The adoption of a new old-growth policy under the administration of Forest Service Chief F. Dale Robertson in 1989 was not limited to the Western United States but affected all of the agency's land base. This agency-wide policy directed that old-growth definitions were to be developed by forest type (or type group) to help land managers determine the extent and distribution of old-growth forests (Robertson 1990).

Shortly thereafter, the SOFES and SEFES joined the Southern and Eastern Regions, and The Nature Conservancy in what would become a multi-year effort to assemble teams of researchers and managers to review the available literature and develop a set of definitions. For much of the next decade, SOFES scientists used their research skills to craft a series of publications (issued following the merger that formed the SRS) that provided definitions of the approximately two dozen major forest types in the Eastern United States (White and Lloyd 1995) following a generally standardized format intended to bring managers the best available science for old forests of those types. SOFES researchers also contributed to an internal agency document (Region 8 Old-Growth Team 1997) that summarized these definition documents and provided national forest managers guidance (but not a policy or other mandate) on the application of this science.

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Ecosystem management comes to the Ouachita National Forest—Another good example of the research and management collaboration between the SOFES and the National Forest System that started during this era is found in the Ouachita Ecosystem Management Research Project. As noted earlier, clearcutting had become a major issue for the Forest Service, and by the late 1980s this challenge flared up on the Ouachita National Forest, a shortleaf pine-dominated landscape that stretches from central Arkansas into eastern Oklahoma. In the 1960s, Ouachita National Forest managers had joined their colleagues across much of the National Forest System in embracing clearcutting as the preferred silvicultural tool on public lands (Robertson 2004). The relatively shade-intolerant shortleaf pine seemed well suited for such practice on a large-scale (with clearcutting and replanting to shortleaf pine in most instances). Although not to the same extent as witnessed elsewhere, local environmental activists objected to the widespread use of clearcutting on the Ouachita National Forest, and eventually found a champion in their cause with Arkansas U.S. Senator David Pryor. Senator Pryor repeatedly reached out to Chief Robertson, who eventually offered to host the senator and other agency staff for a "walk in the woods" in August of 1990. Joining Pryor and Robertson was SOFES Project Leader Jim Baker, stationed in Monticello, AR. Baker and Robertson were classmates many years earlier at Arkansas A&M (today's University of Arkansas-Monticello), and together they were able to demonstrate to Pryor the potential of some of the limited New Perspectives (partial cutting) harvest projects that had just been installed on the Ouachita National Forest (Robertson 2004). By the end of that field day, Forest Service leadership had agreed to use the entire Ouachita National Forest as a New Perspectives Forest to test the still-evolving and largely unproven principles of ecosystem management at a large scale, with the SOFES spearheading a series of studies to investigate the impacts and potential of this change (Robertson 2004). Baker would step aside as project leader to be the Station's point person (team leader) on this multi-phase work, which would soon include hiring James Guldin to help direct the silvicultural studies and the involvement of numerous agency scientists such as Ron Thill (wildlife), Mike Shelton (silviculture), Allen Tiarks (soils), Margaret Devall (ecology), Rod Busby (economics), and others to conduct supporting research (Baker 1994).

Other administrative changes

During this era, administrative oversight of research programs by the Washington Office and station management peaked and began to decline. Early in the era, the programs of each project were overseen by members of the appropriate Washington Office staff and station assistant directors. In-depth meetings of unit scientists were held with user groups and detailed problem analyses were prepared and critically reviewed by station and Washington Office staff. Final project approval frequently took months. This level of detail seemed to be a carryover from years earlier when research scientists typically came with less thorough training.

Later in the era, budgetary issues began to reduce the time for oversight of project programs. The number of Washington Office staff and station assistant directors gradually declined. Also, the influence of industry user groups declined: their critical need for Forest Service research programs lessened.

ERA OF THE MERGER: 1992–1995

As earlier indicated, during the late 1980s and early 1990s, the entire Forest Service experienced considerable change in its administration, organizational structure, and even culture. This included alterations to how its operations were financed. Even though the 1990 NRC review called for significant increases in funding and supportive new forestry legislation, these changes did not occur. Between 1980 and 1995, appropriated funds for Forest Service Research and Development decreased when inflation was considered, the number of scientists had declined from 964 to 721, research locations from 86 to 76, and RWUs from 284 to 185 (National Research Council 2002).

Furthermore, the forest restoration effort in the South had been so effective that there was reduced need for continuing intensive forest productivity research. The need for forestry research in the South shifted to an environmental paradigm (National Research Council 1990). The suggested environmental paradigm would require forestry research to increase in issues such as how forests and climate affect each other; loss of biological diversity; growing demand for wood, wood fiber, and derivative chemical products; increasing demand for the preservation of pristine forested areas; and sustainable wood production integrated with protection of fish, wildlife, water, recreation, and aesthetic values.

To deal with the continuing reductions in this era, SOFES leadership began merging units, closing units and locations, and being selective in filling vacant scientist positions. However, these actions were insufficient to deal with a growing financial crisis and a more radical solution was proposed. Although it had been over 2 decades since the last major Forest Service Research and Development realignment had merged the Central States and Lake States Forest Experiment Stations to produce the North Central Research Station, it appeared that merging more experiment stations was the best option for the agency.

At least that was what was suggested by Forest Service leadership in FY1992. At that time, Chief Robertson proposed to merge the Rocky Mountain and Intermountain Forest Experiment Stations in the Western United States and the Southern and Southeastern Forest Experiment Stations in the Eastern United States (Klade 2006, USDA Forest Service 1993). While a change in administrations temporarily halted the effort (more so for the merger of the Rocky Mountain and Intermountain Stations, which occurred in May 1997), the Forest Service under new Chief Jack Ward Thomas eventually moved ahead with the merging of the Southern and Southeastern Stations (Hill 2000, Klade 2006). Most of the driving force for combining these sets of stations related to pressures to reduce some of the administrative staff and other redundancies, including the reduction of Senior Executive Service (SES) positions at the station director level. According to Klade (2006), the opportunity to reduce an SES position following the impending retirement of SOFES Director Tom Ellis was too good to pass up.

Although there were assurances that funding levels would continue for SOFES projects following any merger, it was obvious that continuing declines would occur. The closure of the Station resulted from the decline in need for the traditional ongoing research programs, not just those of the SOFES, but for the agency's overall programs. These results verified the coffee break discussions that had gone on for years.

Following Ellis' retirement in late 1992, SEFES Director Peter Roussopoulos assumed the helm of acting station director for the SOFES and remained in that acting capacity until the two stations were formally combined in January of 1995. What emerged was now known as the Southern Research Station, headquartered in Asheville, NC (the New Orleans headquarters office of the SOFES closed, although research work units would continue in that city until 2007). With this merger, the SOFES ceased to exist.

CONCLUSIONS

Carter and others (2015), paraphrasing Winston Churchill, said "never in the history of forestry have so many benefited so much from the work of so few." The 74-year history of the SOFES was a remarkable one but is not well known or appreciated by the public. With only a handful of professional foresters and few experienced researchers, despite little technical support and primitive working conditions, forestry made tremendous gains. In its first couple of decades, SOFES scientists helped develop the basic management guidelines that have resulted in great progress in restoring the South's forest lands (Sampson 2004).

Station researchers developed reforestation techniques, studied and began to understand the role of fire in forests, began surveys of southern forests that led to the development and expansion of forest industries, and learned how to control important insect pests and diseases. They also developed an understanding of the importance of statistical design and the value of tree improvement, developed methods of controlling soil erosion, refined the use of artificial regeneration and pine plantation management, and improved the efficiency of producing forest products.

Many of these SOFES studies were long term in nature and the dividends paid out by this approach—a relative rarity in resource research—are clear and still being realized (Devall and Baldwin 1998). While professional competence was an important factor in restoring and enhancing productivity of southern forests, natural resilience of forests also played a significant role. For example, although longleaf pine was found difficult to regenerate, other highly productive species, loblolly and slash pine, filled this gap and have been used to replace much of the old-growth longleaf pine. Wheeler (1970) concluded that the South's second forest "is a result of man and nature working together, and, in many respects, has been more prolific than the First."

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While today (2017 data) the South accounts for only about one-third of the Nation's forestland area and 25 percent of its softwood growing stock, in 2016 it supplied 61 percent of all softwood harvested in the United States (Oswalt and others 2019). The Southern Region's forests supply just over 11 percent of the global industrial roundwood (Oswalt and others 2019). The SOFES and SEFES were largely responsible for developing the underlying knowledge, tools, and techniques required to restore this productive forest land. Collaboration with forest industry, state, and university organizations have made southern forests sustainable. The SOFES scientists, support staff, and administrative employees who spend their careers working for the Station, can look back at their careers with pride in their accomplishments. The contributions of so many can be recognized in the beauty and productivity of forest stands that again occupy the landscape of the South.

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APPENDIX

Southern Forest Experiment Station Directors, 1921-1995

Name	Dates of Service
Reginald D. Forbes	1921–1927
Elwood L. Demmon	1927–1944
Charles A. Connaughton	1944–1951
Harold L. Mitchell	1951–1953
Philip A. Briegleb	1954–1963
Walter M. Zillgitt	1963–1966
Thomas C. Nelson	1966–1970
Robert L. Youngs	1970–1972
John C. Barber	1972–1976
Laurence E. Lassen	1976–1983
Thomas H. Ellis	1984–1992
Peter J. Roussopoulos	1992–1995*

*Peter J. Roussopoulos served as acting station director between 1992 and 1995, until the merger with the Southeastern Forest Experiment Station was completed in 1995.